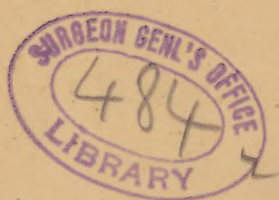


KILVINGTON (S.S.)

The destruction by cremation

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presented by the author

THE DESTRUCTION BY CREMATION

— OF —

GARBAGE, NIGHT SOIL AND REFUSE,

OF TOWNS AND CITIES.

A PAPER READ AT THE MEETING OF THE

AMERICAN PUBLIC HEALTH ASSOCIATION,

BROOKLYN, OCTOBER 24, 1889,

— BY —

DR. S. S. KILVINGTON,

HEALTH COMMISSIONER OF MINNEAPOLIS, MINN., AND CHAIRMAN OF THE COMMITTEE
ON DESTRUCTION OF GARBAGE AND REFUSE.



MR. PRESIDENT AND GENTLEMEN :

A year ago I enjoyed the opportunity of addressing this Association upon the question of refuse-destruction by fire. I outlined, at the same time, the history of cremation, and gave to this body a descriptive sketch of the several crematories manufactured in Great Britain, Canada and the United States. This imperfect report having been embodied in the transactions of the Association, where reference to the facts it recites can readily be had, I shall not weary you with any repetition of its descriptive data.

Moreover, I conceive that it is the function of the Committee which I have the honor to represent, to discuss broadly the actual as well as the ideal methods now in vogue in the disposition of the refuse of our great cities.

By a strange fortuity, the title bestowed upon this Committee would seem to indicate that its duty was limited to a consideration of the question of garbage disposal alone. But such a disavowance of this minor topic from its natural and broader relations is as impossible as it is unwise. Our municipal authorities must meet and solve the problem of the disposition of their refuse materials, as a whole, for no system can be regarded as satisfactory in itself which necessarily demands the separation of one class of these waste materials from all other classes, and leaves the large remainder unprovided for and undisposed of. While we shall all admit that these several forms of refuse must be recognized individually and that all forms cannot be cared for or destroyed by a single process, yet a metropolitan sanitary system must include means for the economical disposition of all its waste products, and, where the cost of labor cuts so large a figure as it does in this country, it cannot afford to undertake the careful selection of garbage to the exclusion of everything else.

In the majority of our cities, this great problem of the disposal of waste matter is still practically unsolved, and that it is so, is due, not to the absence of methods, not to the paucity of inventive skill, nor to a lack of ingenuity in devising means to this desirable end, but, in very large measure, to official indifference and popular ignorance of sanitary essentials.

Hoping I might be able to present to the Association a digest of statistics which would have some practical value, the Chairman of your Committee issued, some weeks ago, a circular letter to the Health Officers of one hundred and seventy-five cities in the United States. The interest which it awakened may be measured by the fact that it elicited replies from but sixty-six. Of these, less than one-third evidenced the possession of any statistics regarding the quantity of waste materials disposed of per annum. This letter also invited an expression of the views of each writer regarding the best method of disposing of refuse materials, and the Committee is glad to acknowledge

very gratefully the efforts made by a few of its correspondents to meet the request. But how little real appreciation of the pressing importance of such an inquiry exists, either in the professional or the public mind, is illustrated over and over again in the larger number of these replies. Health officials in cities ranging from 100,000 to 500,000 in population, remark that they "have not thought about it," that they "have no opinion on the subject" and that they "have had no experience and entertain no views," while, on the other hand, one unfortunate Health Officer, in a city of some 30,000 people, himself enthusiastic for sanitary reform, plaintively declares that, in his town, as in ancient Sodom, there "are not ten righteous" enough to manifest the least interest in health measures of any kind. But although these reports from our principal American cities are rich neither in figures nor in practical views, they offer abundant testimony to the fact that in the matter of waste disposal we are, for the most part, in a deplorable condition.

If we do not share the fate of the ancient cities of the plain and are overtaken by no Nemesis in the way of regenerating fire and brimstone; if, like the Europe of the middle ages, we are not to be purified by the plague; if the cholera, in some of its periodic travels from its Indian home does not find a foothold upon our shores, it is simply because we are endowed with a wealth of air, of soil and of water, which permits us to violate, for a time, with seeming impunity the laws of health.

But an end to this period of abused privilege is at hand. The characteristic feature of our economic development is the increasing concentration of people in cities, and it carries with it a menace to the public health. We can no longer leave to nature the chemistry of our waste products without danger to ourselves. She demands acreage per capita for her operations where we can afford to give her a beggarly allowance of square feet. And yet, to-day, in all but perhaps a dozen of our American cities, we are still taxing nature with this impossible task. Witness these reports, which include among them the cities of New York, Brooklyn, Philadelphia, Chicago, Milwaukee, Minneapolis, St. Paul, Detroit, Buffalo, Memphis, New Orleans, San Francisco, Oakland (Cal.), Manchester, Norfolk, San Antonio, Galveston, Cleveland, Dayton, Syracuse, Wilmington, Taunton, Providence, New Haven, Jersey City, Worcester, Denver, Savannah, Rochester, Springfield, New Bedford, Cambridge, Reading, Atlanta, Charleston, Pittsburgh, Alleghany, Washington, Richmond, Bridgeport, Omaha, Kansas City, Louisville, Toledo, Chattanooga, Cincinnati, Nashville, St. Louis, Rock Island, Dubuque, Hamilton, Leavenworth and Council Bluffs.

The refuse materials these cities have to dispose of come under seven heads: 1, ashes; 2, garbage; 3, offal; 4, dead animals; 5, manure; 6, night-soil; 7, sewage. What becomes of them? The first item, ashes, may be dismissed with the statement that this material is commonly and wisely employed in the making of roads, the leveling of alleys, and the filling of low lots. There is nothing objectionable in this practice, provided sufficient care is taken to keep the ashes free from animal and vegetable waste. It would be fortunate if all our refuse could be disposed of as easily and as harmlessly as this. The three succeeding items—garbage, offal and dead animals—may be discussed in common, for they are usually subjected to similar treatment and are alike susceptible of the more superior methods of disposal.

We find that these materials have a widely variant destiny in different cities.

1. They are fed to domestic animals! notably to milk cows and swine, and one health officer assures us that the hog not only consumes but collects his diet at large, and that a "fine scavenger he is and does it free of charge."

2. They are dumped into neighboring rivers, lakes or ocean.

3. They are buried in many instances, outside the city limits.

4. They are rendered either by ordinary soap and grease producers or by a process known as the "Merz system."

5. They are burned either in open fires or by means of some one or other of the several crematories now in use.

Animal manure usually goes with these other materials into the water-courses; it is sometimes buried, is seldom burned, and oftener is carried to the country districts and used for fertilizing in its raw form.

Night-soil is occasionally composted and employed to enrich the soil; is more commonly used to improve the water supply; is once in a while destroyed by fire; and is quite generally buried upon a dumping-ground or left in privy vaults which are economically covered and replaced by new ones so soon as they are filled.

Sewage is carried into river, lake or ocean, as the case may be, save in those rare instances, of which the city of Pullman, Illinois, is a type, where it is disposed of upon sewage farms.

Now what of the results? Comment upon the practice of feeding garbage, offal and carrion to animals destined for use as human food, is unnecessary. The hog may be as good a scavenger as the jackal or the dog of Asiatic communities, but he merely substitutes one nuisance with another and should be regarded unclean, in consequence, by Christian as well as Jew.

The protest which should be uttered against the pollution of either river, lake or ocean by the deposit therein of waste materials, must differ only in a degree proportional to the character of the body of water and the domestic usage to which it is put.

The practice is undesirable at the best, and is intolerable, so far as river and lake is concerned, when either is the necessary source of water-supply to communities resident

upon its shores. The extent to which this crying abuse is carried can only be remotely estimated by the few figures at command, but these are sufficient to call forth alarm and to emphasize the necessity for a radical reform. They are suggestive enough to warrant quotation.

In the Mississippi River, eight cities alone deposited during the past year 152,675 tons of garbage, manure and offal, 108,250 tons of night-soil, and 3,765 dead animals.

Into the Ohio River, five cities alone dumped, within the same period, 46,700 tons of garbage and offal, 21,157 tons of night-soil and 5,100 dead animals.

Into the Missouri River, four cities alone have cast, in the same twelve-month, 36,110 tons of garbage, manure and offal, 22,400 tons of night-soil and 31,160 dead animals. Recall the fact that a large proportion of these animals have been killed because they were suffering from glanders, farcy, hog-cholera, hydrophobia, pleuro-pneumonia, and tuberculosis, multiply these figures by the lowest possible multiple, and add to this great mass of decomposing material some thousands of miles of sewage discharged into these three rivers, and the mind can form some dim conception of the degree of their pollution. No theory of the self-purification of running water will suffice to dwarf the magnitude of this sanitary crime. Happily, the United States Corps of Engineers has taken cognizance of this evil, in its recent reports to the Government, and it is to be hoped that the National authorities will, ere long, put a peremptory veto upon its continuance.

Like condemnation should be put upon the practice of the earth-burial of waste materials in large masses and in close proximity to our great cities. What shall be said of communities, ranging in population from 100,000 to 1,000,000, which boast the possession of fifty or a hundred acres of land just inside or outside their corporate limits, upon which they dump or bury, in closely planted shallow pits, thousands of tons of night-soil, garbage, offal and dead animals? The human cemetery, fraught with peril to the purity of air and soil and water, and destined to endanger life and health as a spreading population hems it in, is innocent in comparison with this. And what sort of sanitary recompense is in store for cities whose officials confess to the filling in of low lots with the contents of their cess-pools and privy-vaults, or to the habitual burying of these conveniences as they become filled? What is to be the future health history of a community whose building sites are honeycombed with these deposits?

But even while we view with consternation these crude attempts at the disposal of refuse, we greet with pleasure the evidences that a better time is coming in the sanitary management of these materials. Two methods remain which commend themselves to the student of this important theme, viz.:

1. The rapid decomposition of these waste products, by the speedy withdrawal of the water and gases they contain, with a view to converting them into profitable forms of fertilizer.

2. The rapid and complete combustion of these materials, with a view to their entire destruction.

The first of these methods has the advantages of intended economy. It is eminently proper that animal and vegetable waste matter should, if possible, be returned to the soil, of which they constitute the natural and necessary nutriment. Animal manure and stable refuse may be safely conveyed, in their raw form, as it were, to farm or garden lands, provided the latter, in need of fertilization, exist within so short a distance from the limits of a city that the cost of the carriage of so bulky a fertilizer will not put it beyond the reach of the agriculturist. As a rule, however, he demands soiling materials in concentrated form and the process, and the apparatus that will produce these safely and cheaply is the hope of the future. Rendering-works have attempted to reach this result and do reach it in a clumsy way; but the remedy is commonly so much worse than the evil they seek to cure, that they cannot be tolerated within or near the limits of a city. A scientific piece of apparatus, known as the "Merz System," has been devised and is—or is soon to be—in operation in three or four large cities in the United States. It treats only garbage, and one pointed objection to the system is the necessity for the separation of the former from other waste materials. It has to prove itself upon the ground alike of economy and of sanitary safety before it can be accepted as a satisfactory solution of even this part of our problem. Like all other apparatus, much of its success must depend upon the care and intelligence that are bestowed upon it in its daily operation. Unquestionably, it is possible to apply scientific and sanitary principles to the rendering of animal fats, vegetable oils and residuous fertilizers, but they must be applied in such a way that the products will be marketable, wholesome and easy of transportation. And, even after these substances have thus been dealt with, we have a wealth of material on our hands in the way of dead animals, night-soil and sewage, which must soon be forbidden deposit in our water-courses and great lakes, and which has an even more noxious quality and an even higher fertilizing value than the garbage and dead animals with which the "Merz System" proposes to deal. With these concentrated soiling materials at hand, demanding some disposal, is it, after all, worth while to extract the comparatively scanty fertilizing residuum which remains after the rendering of carrion and vegetable waste? Is it not better and cheaper and safer to destroy at once, by cremation, these readily combustible materials, together with stable refuse, and to apply ourselves most assiduously to the problem of deodorizing, diluting and safely transporting to the soil the sewage and night-soil with which every large community is so injuriously burdened. So high a percentage of fer-

utilizing value per volume do these materials possess, that they promise a revenue which will well repay the cost of preparation and safe carriage. But a small bulk of such a fertilizer, in convenient form for handling and distribution, would be required by the gardner or farmer to fructify his lands, in comparison with the amount of the solid fertilizing residuum of animal and vegetable matter, in the gross, which he would need.

In the meantime, the crematory, under several patents, has proved itself to be a practical success in many places. The Eagle, the Rider, the Patrick and the Mann furnaces are actively in use in several cities. Out of thirty-five health officials, who have favored me with a reply to my request for an expression of opinion upon the disposal of garbage and other refuse matter, twenty-three endorse the practice of cremation. Says Dr. Salmon, of the Louisiana Board: "Cremation I believe to be the best, safest and only sanitary method of garbage disposal."

Dr. Bidwell, of Leavenworth, says: "I am decidedly in favor of cremation as the best method of disposing of waste materials."

"There is only one scientific and practical way of disposing of garbage, and that is cremation," says Dr. Trebel, of Hamilton, Ohio. "Every city of 20,000 people should have a crematory," he adds.

"I am of the opinion," remarks Dr. Dudley, of St. Louis, "that cremation is generally the best method."

Dr. Ewing, of New York, replies: "There is no doubt in my mind that the best method of disposal is by cremation."

"I am in favor of burning," says Dr. Martin, of Chattanooga.

Thus is public sentiment manifesting itself throughout the country.

To begin with first principles, I would educate the people, if possible, up to an appreciation of the advantages of this method. The household cremation of animal and vegetable waste is a sanitary and an economic possibility. The ordinary kitchen range or the house furnace is a good incinerator. If the habit of banking up table-refuse to dry upon one side of the stove or heater, fire be adopted, it will be found that this material, freed of its excess of moisture, is an excellent form of fuel in itself. This complete destruction of household waste does away with all necessity for its accumulation and removal. The owners of markets and commission houses, restaurants and hotels would find it equally profitable to provide themselves with small private crematories for the destruction of refuse. Such a device, easy to operate, economic in its cost of support, and sanitary in its results, can be readily obtained. And as for municipal needs, which, after all private effort may do, will still remain in large measure, I have found no reason, in the past year, to change my belief that cremation is, if not a perfect process, at least the most desirable method for the disposal of the greater part of a city's refuse.

A somewhat varied and difficult experience in the attempt to educate the public in this faith, has taught me that in order to its best success, a crematory must be carefully constructed, after a chosen model, and should be continuously operated. So built and so conducted, I believe it will most safely and economically dispose of all the coarser and combustible kinds of waste material. My own choice has fallen upon the Eagle Patent as being, with certain modifications, the most promising in its results. Its essential feature, without which, in some form, a crematory cannot be a sanitary success, is the provision of a second fire intended for the destruction of the noxious gases and vapors which inevitably escape the primary fire. Models of this and other patent furnaces are on exhibition to members of the Association, and will deserve your scrutiny. In New York, at the foot of East 16th street, East River, built for the Board of Health, the Eagle Crematory may be seen in practical operation and will speak for itself; to those who have not investigated the merits of the system, the trip to that point would be a very profitable one.

To return to our general theme: Among the hopeful indications of sanitary reform, the effort being made in several of our large cities toward the abolition of the privy-vault system is deserving of especial mention. Such a step will ultimately simplify the problem of waste disposal in the matter of one of its most important factors.

New York, is, I believe, the only city where this reform-measure is an accomplished fact, but other communities are following in its wake. Where sewerage does not exist, decided preference should be given to the well-constructed earth-closet; where the sewer is available, connections should be ordered as rapidly as possible. Minneapolis is, I am happy to say, now taking her initial steps in this direction.

The most important bar to the progress of the health-measures we have discussed lies in the torpor of public sentiment, and it should be the highest function of this Association to stimulate the education of the people in these interests. We have relied too long and too implicitly upon our natural advantages, to the neglect of those precautions which would tend to preserve them.

In this respect, European cities are in advance of us, for while their natural conditions are inferior, they have learned to enhance them by artificial means. Modern London, Glasgow, Edinburgh, Paris, Berlin and Naples are object-lessons to us of a past which points with warning finger to our future and of a present which sets for us the example of timely and efficient reform.

The American people are slow to learn the worth of improvements which cannot be estimated by commercial standards, and yet, in these days, it is undoubtedly true that health is an indispensable commodity, and that length of days and long life have an economic as well as an ethical value.

